

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A defect data analysis method comprising the steps of:
obtaining defect position information ~~positions~~ by inspecting a substrate with an inspection apparatus, wherein the substrate is processed in a process of circuit pattern formation on the substrate;
storing the obtained defect position information in memory;
processing the defect position information stored in the memory using a processor;
obtaining distribution of defects on the processed substrate from the processed defect position information obtained;
classifying the obtained defect distribution of defects characteristics into [[any]] one of the following a plurality of distribution shape characteristic categories by using a defect distribution shape classifier and the processed information on the defect position information, wherein the plurality of distribution shape characteristic categories comprises on the processed substrate : repeated defects, clustered defects, arc-shaped regional defects, radial regional defects, line type regional defects, ring and blob type regional defects and random defects ~~defect~~; and
displaying, on a display screen, the classified distribution of defects, wherein the distribution shape characteristic categories are each displayed results by using different colors for respective categories.
2. (Currently amended) A defect data analysis method as claimed in claim 1,
further comprising: wherein
detecting the arc-shaped regional defects are detected by obtaining a center candidate point of the defect distribution of defects ~~from the defect distribution characteristic~~ on

[[the]] Cartesian coordinates and extracting the arc-shaped regional defects from corresponding [[a]] polar coordinate information ~~on each defect~~ using the center candidate point as an origin.

3. (Currently amended) A defect data analysis method as claimed in claim 2 [[1]], wherein the center candidate point of the defect distribution of defects is ~~extracted as~~ a point having more intersections of perpendicular bisectors of straight lines connecting ~~arbitrary~~ two arbitrary defects among the defects distributed on the processed substrate.

4. (Original) A defect data analysis method as claimed in claim 1, wherein the defects classified into the arc-shaped regional defects are judged to be scratches generated by CMP (chemical mechanical polishing).

5. (Currently amended) A defect data analysis method as claimed in claim 1, wherein the radial regional defects are detected by creating distribution data on a ρ θ space based according to the information on information associated with ~~the Cartesian coordinate space of~~ the defects distributed on the processed substrate on Cartesian coordinate space and extracting the radial regional defects from the distribution data on the ρ θ space.

6. (Currently amended) A defect data analysis method as claimed in claim 5, further comprising: wherein

converting the information associated with [[on]] the defects distributed on the processed substrate on the Cartesian coordinate space is ~~converted~~ into the defect position information on the polar coordinate space by using:

a the information on the distance between a [[the]] straight line connecting arbitrary two arbitrary ~~of the defects distributed~~ on the processed substrate and an [[the]] origin of the Cartesian coordinate space, and

an information on the angle defined by an [[the]] X axis and a [[the]] perpendicular drawn from the origin of the Cartesian coordinate space ~~coordinates~~ to a straight line connecting ~~arbitrary~~ two arbitrary [[of]] defects.

7. (Currently amended) A defect data analysis method comprising the steps of:
obtaining defect distribution information of the defects on a [[the]] processed substrate from defect position information, wherein the defect position information is obtained by inspecting the [[a]] processed substrate with an inspection apparatus, the substrate being processed in a process for forming a circuit pattern on the substrate;

storing the obtained defect distribution information in memory;

processing the stored defect distribution information using a processor;

identifying repeated defects by using the processed ~~obtained~~ defect distribution information, wherein the repeated defects are defects which are distributed on the substrate in a repeated pattern;

identifying clustered defects by using the processed ~~obtained~~ defect distribution information, wherein the clustered defects are defects which are distributed on the substrate in a cluster;

identifying arc-shaped regional defects by using the processed ~~obtained~~ defect distribution information, wherein the arc-shaped regional defects are defects which are distributed on the substrate in an arc-shape;

identifying radial regional defects by using the processed ~~obtained~~ defect distribution information, wherein the radial regional defects are defects which are radially distributed on the substrate;

identifying line type regional defects by using the processed ~~obtained~~ defect distribution information, wherein the line type regional defects are defects which are linearly distributed on the substrate;

identifying ring and blob type regional defects by using the processed ~~obtained~~ defect distribution information, wherein the ring and blob type regional defects are defects which are distributed on the substrate in a ring and blob shape;

identifying ~~extracting~~ random defects by using the processed ~~obtained~~ defect distribution information, wherein the random defects are defects which are randomly distributed on the substrate; and

processing information associated with the identified defects using the processor,
wherein the information is processed to classify differently identified defects into different defect
distribution categories; defect information obtained from the step of identifying the repeated
defects to the step of identifying the random defects and

displaying the processed information on a display screen, wherein the processed
information is displayed such that the different defect distribution categories are displayed [[by]]
using different colors.

8. (Currently amended) A defect data analysis method as claimed in claim 7,
wherein displaying the processed information comprises:

processing step is realized by displaying the processed defect information in a
wafer map format on the display screen.

9. (Currently amended) A defect data analysis method as claimed in claim 7,
wherein in the step of identifying arc-shaped regional defects and in the step of identifying radial
regional defects, the arc-shaped regional defects and the radial regional defects are identified
[[by]] using defect polar coordinate information created according to the obtained defect
distribution information.

10. (Currently amended) A defect data analysis method comprising the steps of:
creating a wafer map showing positions of all the defects on a coordinate system
based on a [[the]] wafer origin reference according to [[the]] defect data including at least a
defect position coordinate table of defects obtained by inspecting a processed substrate with an
inspection apparatus, wherein the substrate is processed by in a process for forming a circuit
pattern on the substrate;

storing the wafer map in memory; and

processing the wafer map stored in the memory using a processor, wherein
processing the wafer map comprises:

weighting a point where a perpendicular of ~~arbitrary~~ two arbitrary defects from the wafer map passes according to a ~~[[the]]~~ distance between the two arbitrary defects, ~~[[and]]~~

voting the point onto Cartesian coordinate ~~the xy~~ space, ~~[[;]]~~

detecting Cartesian coordinates (x, y) corresponding to a ~~[[the]]~~ maximum value on the voted space, ~~[[;]]~~

polar-coordinate-converting the wafer map onto ~~[[the]]~~ $r\theta$ space ~~[[by]]~~

using the detected Cartesian coordinates (x, y) as an ~~[[the]]~~ origin, ~~[[;]]~~ and

identifying an arc-shaped regional defect according to a horizontal segment detected in a ~~the aforementioned~~ polar coordinate converted state.

11. (Currently amended) A defect data analysis method comprising the steps of:
creating a wafer map showing positions of ~~all the~~ defects on a coordinate system based on a ~~[[the]]~~ wafer origin reference according to ~~[[the]]~~ defect data including at least a defect position coordinate table of defects obtained by inspecting a processed substrate with an inspection apparatus, wherein the substrate is processed by in a process for forming a circuit pattern on the substrate; ~~[[,]]~~

storing the wafer map in memory; and
processing the wafer map stored in the memory using a processor, wherein processing the wafer map comprises:

weighting p, θ coordinates corresponding to a segment connecting ~~arbitrary~~ two arbitrary defects from the wafer map according to a ~~[[the]]~~ distance between the two arbitrary defects, ~~[[and]]~~

voting the p, θ coordinates, ~~them; and~~

detecting a plurality of peaks on the voted coordinates, ~~space~~ and

when concentration of voting to a predetermined range around $p=0$ exceeds a predetermined threshold value, identifying a radial regional defect according to the peaks contained in the range.

12. (Currently amended) A defect data analysis apparatus comprising:
input means for inputting defect position information ~~on the defect positions~~
obtained by inspecting a processed substrate, wherein the substrate is processed by in a process
~~for forming a circuit pattern on the substrate;~~
defect distribution calculation means for obtaining distribution of ~~[[the]]~~ defects
on the processed substrate from the defect position information ~~on the defect positions input~~
~~from the input means;~~
defect distribution shape characteristic category classification means for, ~~by using~~
~~the defect position information on the processed substrate,~~ classifying the defect distribution of
defects ~~characteristic~~ obtained by the defect distribution calculation means into ~~[[any]]~~ one of a
plurality of distribution shape characteristic categories comprising: repeated defects, clustered
defects, arc-shaped regional defects, radial regional defects, line type regional defects, ring and
blob type regional defects, and random defects, wherein the classifying is performed based on
the defect position information; and
output means for outputting ~~the information on the~~ classified defect distribution of
defects ~~classified by the defect distribution characteristic category classification means.~~

13. (Currently amended) A defect data analysis apparatus as claimed in claim 12,
wherein the output means includes a display section for displaying ~~the information on the~~
classified defect distribution of defects, wherein the distribution shape characteristic categories
are each displayed ~~classified by the defect distribution characteristic category classification~~
~~means by using a different color~~ colors ~~for the respective distribution characteristic categories.~~

14. (Currently amended) A review system comprising:
an inspection apparatus for scanning a surface of a processed substrate by light or
electronic beam ~~[[so as]]~~ to detect ~~inspect~~ a foreign matter or a pattern defect on the processed
substrate and outputting defect data comprising ~~containing~~ at least position coordinates of the
detected foreign matter or the pattern defect; and
a defect data analysis apparatus for, ~~by using the defect position coordinate~~
~~information contained in the defect data output from the inspection apparatus,~~ obtaining a defect

distribution shape characteristic using the position coordinates and for classifying the defect distribution shape characteristic into [[any]] one of a plurality of defect [[the]] distribution shape characteristic categories, wherein the plurality of defect distribution shape characteristic categories comprises: repeated defects, clustered defects, arc-shaped regional defects, radial regional defects, line type regional defects, ring and blob type regional defects, and random defects,

wherein an image of each [[the]] defect distribution shape characteristic ~~classified~~ ~~by the defect data analysis apparatus~~ is acquired by the light or the electron beam and reviewed.

15. (Currently amended) A review system as claimed in claim 14, wherein the defect data analysis apparatus creates a report of ~~according to the review result by the review apparatus and the~~ classified ~~information on the~~ defect distribution shape characteristics ~~pattern~~ ~~classified by the defect data analysis apparatus.~~